 NAME: _____

Kinetic & Potential Energy Lab

art one: Potential Energy:

Potential Energy is the mechanical energy of position. In other words, potential energy is how much potential something has to do work. The formula used to measure P.E. is:

P.E. = Mass x g x Height

THINK: Think about this and take a guess: How would the potential energy of an object be different on the moon?

_____

_____

_____

Instructions : Determine the Gravitaional potentional Energy in the situation below:

Object	Mass (g)	Mass kg	Location	Height (m)	P.E.
Paperback Book			On Floor		
Paperback Book			On Desk		
Paperback Book			On Top of the Tallest group Member's head.		
Agenda/ Planner			On Floor		
Agenda/ Planner			On Desk		
Agenda/ Planner			On Top of the Tallest group Member's head.		
Beaker			On Floor		
Beaker			On Desk		
Beaker			On Top of the Tallest group Member's head.		
Matchbox Car			On Floor		
Matchbox Car			On Desk		
Matchbox Car			On Top of the Tallest group Member's head.		

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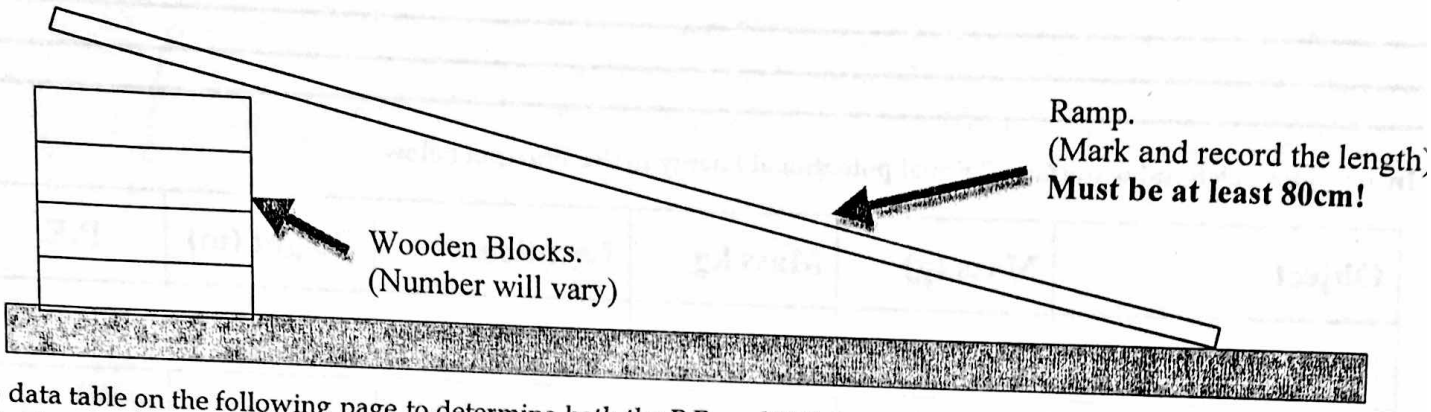
Part two: Kinetic energy

Kinetic Energy is the mechanical energy of motion. In other words, kinetic energy is how much work an object is currently doing. The formula for determining K.E. is:

$$K.E. = 1/2\ (m \times v^2)$$

And the formula for measuring velocity/speed is:

V = D/T (D = displacement (in meters); T = time (in seconds))



Fill in the data table on the following page to determine both the P.E. and K.E. for each situation. Remember, release the car with the front wheels a distance of 80 cm from the bottom each time you do a trial:

Experiment One: Ramp with Two Blocks

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Experiment Two: Ramp with Three Blocks

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

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Experiment Three: Ramp with Four Blocks

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Experiment Four: Ramp with Five Blocks

Trial	Mass (kg)	Distance Traveled by Car (meters)	Time (seconds)	Velocity (m/s)	K.E. (Joules)
1					
2					
3					

Wrap-up Questions:

1) The higher an object is off of the ground, the **more/less** potential energy it has.

2) Would a matchbox car have **more/less** potential energy on the moon than it does on the earth? Explain:

3) The faster an object moves, the more _____ _____ it has.

4) The higher an object is off of the ground, the more _____ _____ it has.

5) Which has a greater effect on the kinetic energy of an object...mass or velocity? EXPLAIN!!!

6) Assuming that the ramp in the lab has no friction what could you conclude about the potential energy and kinetic energy. (Hint: Conservation of Energy)

7) A 750-kg compact car moving at 100 km/hr has approximately 3,750,000 Joules of kinetic energy. What is the kinetic energy of the same car if it is moving at 25 km/hr?

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8) What scientific equipment do you need in order to calculate potential energy?

9) You are on roller blades on top of a small hill. Your potential energy is equal to 1,000 joules. The last time you checked your mass was 60.0 kilograms.

a. What is your weight in newtons?

b. What is the height of the hill?

c. If you start skating down this hill, your potential energy will be converted to kinetic energy. At the bottom of the hill, your kinetic energy will be equal to your potential energy at the top. What will be your speed at the bottom of the hill?

10) In a lab investigation, one group of students (group A) measures the speed of a 0.1-kilogram car at 2.5 m/sec at the bottom of a hill. Another group of students (group B) measures the speed of the car at 3 m/sec at the bottom of the hill. The car's starting position at the top of the hill is one-meter high.

a. What is the potential energy of the car at the beginning of the experiment before its speed is measured?

b. Calculate the kinetic energy of the car for group A using the speed (2.5 m/sec) and mass values above.

c. Calculate the kinetic energy of the car for group B using the speed (3.0 m/sec) and mass values above.

d. At the bottom of a hill, the kinetic energy of the cars should be equal to the potential energy of the car at the top of the hill. Are the kinetic energy values for groups A and B equal to, less than, or greater than the potential energy value?

e. The energy of an object can be converted to heat due to the friction of the car on the hill. The difference between the potential energy of the car and its kinetic energy at the bottom of the hill equals the energy lost due to friction. How much energy is lost due to heat for group A's car? How much for group B's car?